

In re Appln. of CHAWLA et al.
Application No. 10/008,489

CLAIM AMENDMENTS

1. (Currently Amended) A radiation-curable adhesive composition for a digital versatile disc (DVD) that includes a reflective or semi-reflective layer, the adhesive composition comprising components that undergo polymerization when exposed to radiation, a first component comprising a photoinitiator and a second component selected from the group consisting of acyclic thiols, heterocyclic compounds of the formula R-SH or R¹-R², and mixtures thereof in an amount no more than about 0.1 wt.%, which amount is sufficient to inhibit corrosion of the reflective or semi-reflective layer, and does not reduce the cure rate or overall cure of the composition.

wherein R is a heterocycle, R¹ is a substituted or unsubstituted phenyl as a substituent of R² or forming with R² a bicyclic structure, and R² is a heterocycle comprising at least one double bond and at least two N atoms.

2. (Original) The radiation-curable composition according to claim 1, wherein the corrosion inhibiting component is a heterocyclic compound of the formula R-SH or R¹-R², and R is selected from the group consisting of:

(a) a bicyclic compound comprising a heterocycle and a substituted or unsubstituted phenyl,

(b) a single-ring heterocycle comprising a substituted or unsubstituted phenyl component as a substituent thereof, and

(c) a heterocycle comprising N, S or O in its ring structure, and wherein R¹-R² is selected from the group consisting of:

(a) a bicyclic compound comprising a heterocycle and a substituted or unsubstituted phenyl, and

(b) a single-ring heterocycle comprising a substituted or unsubstituted phenyl component as a substituent thereof.

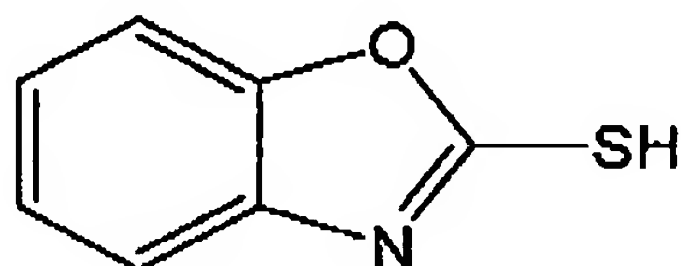
3. (Original) The radiation-curable adhesive composition according to claim 2, wherein N and N, S or O are in the heterocycle ring.

Claim 4 (Canceled)

5. (Original) The radiation-curable composition according to claim 3, wherein the corrosion-inhibiting component is a heterocyclic compound of the formula R-SH, and R is a bicyclic compound comprising a heterocycle and a substituted or unsubstituted phenyl.

In re Appln. of CHAWLA et al.
Application No. 10/008,489

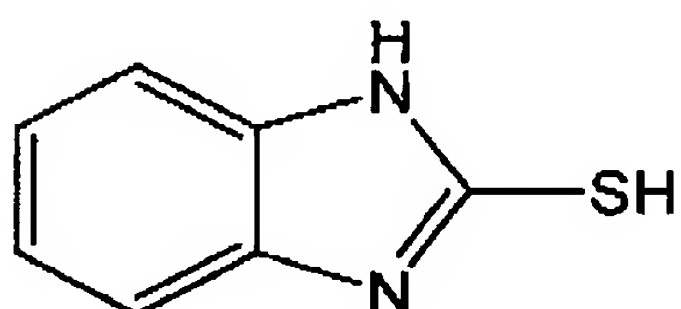
6. (Original) The radiation-curable composition according to claim 5, wherein the corrosion-inhibiting component is



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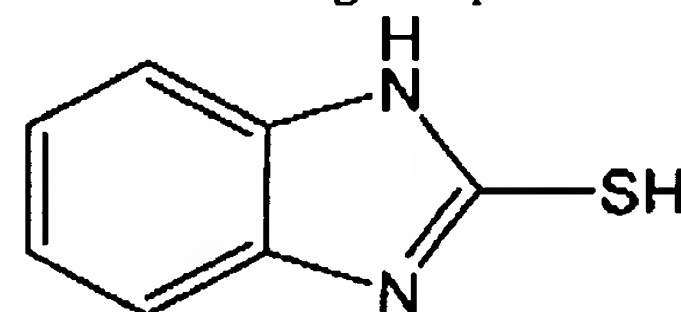
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or mixtures thereof.

7. (Original) The radiation-curable composition according to claim 6, wherein the corrosion-inhibiting component is

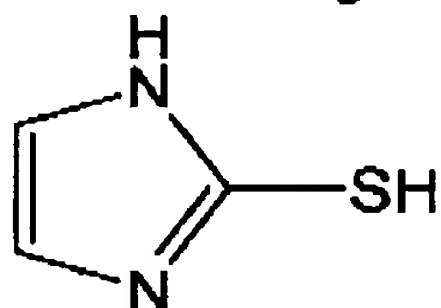


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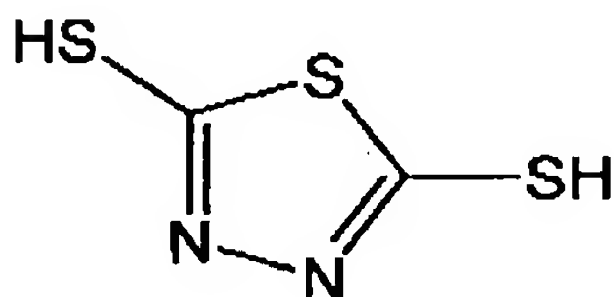
8. (Original) The radiation-curable composition according to claim 3, wherein the corrosion-inhibiting component is a heterocyclic compound of the formula R-SH, and R is a single-ring heterocycle.

In re Appln. of CHAWLA et al.
Application No. 10/008,489

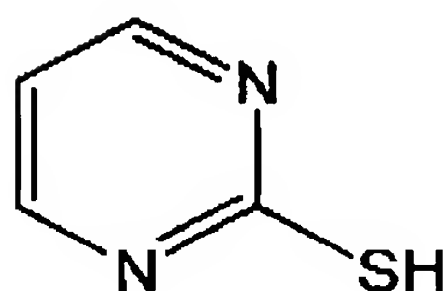
9. (Original) The radiation-curable composition according to claim 3, wherein the corrosion-inhibiting component is



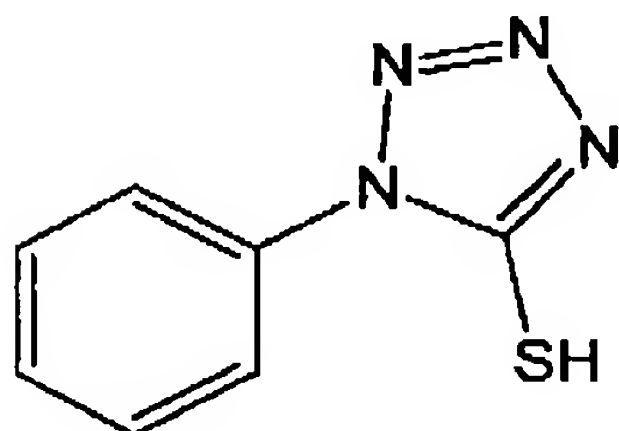
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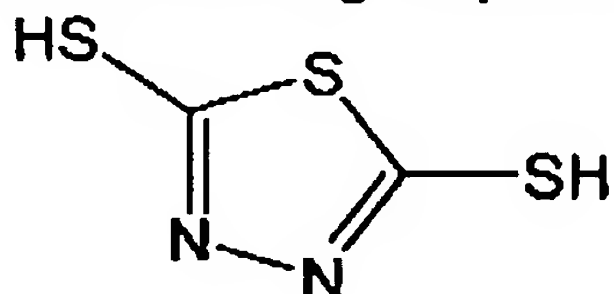
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or mixtures thereof.

10. (Original) The radiation-curable composition according to claim 9, wherein the corrosion-inhibiting component is

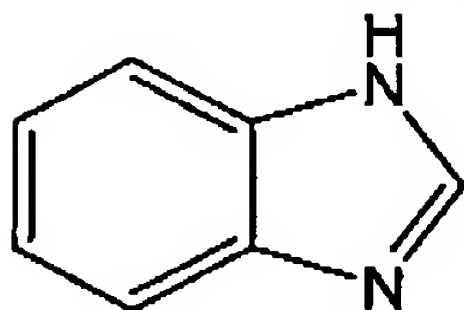


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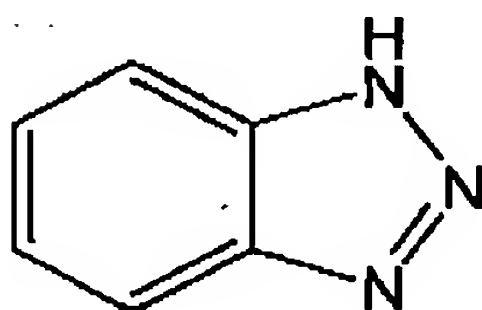
In re Appln. of CHAWLA et al.
Application No. 10/008,489

11. (Original) The radiation-curable composition according to claim 3, wherein the corrosion-inhibiting component is a heterocyclic compound of the formula R^1-R^2 , and wherein R^1-R^2 is a bicyclic compound comprising a heterocycle and a substituted or unsubstituted phenyl.

12. (Original) The radiation-curable composition according to claim 11, wherein the corrosion-inhibiting component is



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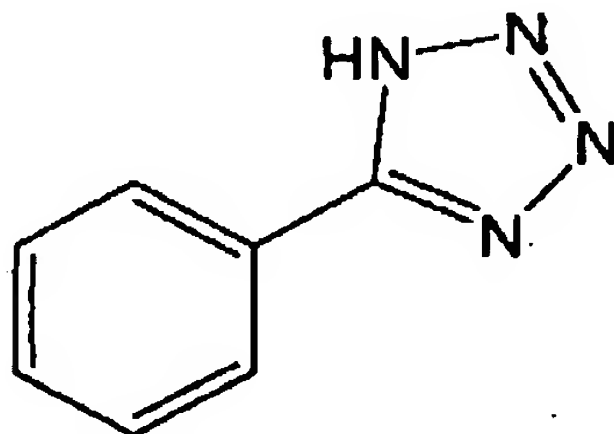


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or mixtures thereof.

13. (Original) The radiation-curable composition according to claim 3, wherein the corrosion-inhibiting component is a heterocyclic compound of the formula R^1-R^2 , and wherein R^1-R^2 is a single-ring heterocycle comprising a substituted or unsubstituted phenyl component as a substituent thereof.

14. (Original) The radiation-curable composition according to claim 13, wherein the corrosion-inhibiting component is



8

In re Appln. of CHAWLA et al.
Application No. 10/008,489

15. (Original) The radiation-curable adhesive composition according to claim 1, wherein the composition cures via cationic polymerization.

16. (Original) The radiation-curable adhesive according to claim 1, wherein the adhesive is a hybrid adhesive, the hybrid adhesive further comprising a radiation-curable component that cures via free-radical polymerization.

17. (Original) The radiation-curable composition according to claim 1, wherein the corrosion-inhibiting component is an acyclic thiol.

18. (Original) The radiation-curable composition according to claim 17, wherein the acyclic thiol comprises a chain which includes a heteroatom.

19. (Original) The radiation-curable composition according to claim 18, wherein the acyclic thiol comprises a chain of up to 16 atoms, a plurality of heteroatoms at least two of which are N atoms, and a plurality of polar functional groups.

20. (Currently Amended) Optical media comprising a reflective or semi-reflective layer and a cured radiation-curable adhesive composition, the radiation-cured composition prepared by curing a radiation-curable composition comprising components that undergo polymerization when exposed to radiation, a first component comprising a photoinitiator and a component selected from the group consisting of acyclic thiols, heterocyclic compounds of the formula R-SH and R¹-R², and mixtures thereof in an amount no more than 0.1 wt.%, which amount is sufficient to inhibit corrosion of the reflective or semi-reflective layer and does not reduce the cure rate or overall cure of the composition, wherein R is a heterocycle, R¹ is a substituted or unsubstituted phenyl as a substituent of R² or forming with R² a bicyclic structure, and R² is a heterocycle comprising at least one double bond and at least two N atoms.

21. (Previously Presented) The optical media according to claim 20, further comprising at least two substrates, wherein the reflective or semi-reflective layer comprises silver, gold, silicon, copper, aluminum or alloys thereof, and wherein the cured adhesive bonds at least two of the substrates to one another.

In re Appln. of CHAWLA et al.
Application No. 10/008,489

22. (Original) The optical media according to claim 20, wherein the optical media is a DVD comprising at least two substrates and meets at least one of the following criteria:

- (a) the substrates remain adhered to one another after the DVD is dropped on its edge onto a concrete floor from a height of 75 cm;
- (b) the substrates do not delaminate after exposure to an environment consisting of 80°C/85% relative humidity for at least 1000 hours;
- (c) the cured adhesive exhibits a cured film elongation at break of at least 20%;
- (d) the cured adhesive exhibits shrinkage upon cure of no greater than about 10%; or
- (e) the cured adhesive exhibits a shear strength of about 10 lbs to about 100 lbs.

23. (Original) The optical media according to claim 22, wherein the optical media meets at least two of the criteria (a)-(e).

24. (Original) The optical media according to claim 23, wherein the optical media meets at least three of the criteria (a)-(e).

Claim 25. (Canceled)

26. (Original) The optical media according to claim 21, wherein corrosion is limited to no more than about 15% of the total reflective and semi-reflective layer after the optical media is exposed to an environment of 80°C/85% relative humidity environment for 48 hours.

27. (Original) The optical media according to claim 26, wherein the media exhibits no more than slight corrosion after the optical media is exposed to an environment of 80°C/85% relative humidity environment for 48 hours.

28. (Original) The optical media according to claim 27, wherein the media exhibits no more than slight corrosion after exposure to an aqueous 5 wt.% NaCl solution for 48 hours.

29. (Original) The optical media according to claim 21, wherein the corrosion-inhibiting component is an acyclic thiol.

In re Appln. of CHAWLA et al.
Application No. 10/008,489

30. (Original) The optical media according to claim 21, wherein the corrosion inhibiting component is a heterocyclic compound of the formula R-SH or R¹-R², and R is selected from the group consisting of:

- (a) a bicyclic compound comprising a heterocycle and a substituted or unsubstituted phenyl,
 - (b) a single-ring heterocycle comprising a substituted or unsubstituted phenyl component as a substituent thereof, and
 - (c) a heterocycle comprising N, S or O in its ring structure,
- and wherein R¹-R² is selected from the group consisting of:
- (a) a bicyclic compound comprising a heterocycle and a substituted or unsubstituted phenyl, and
 - (b) a single-ring heterocycle comprising a substituted or unsubstituted phenyl component as a substituent thereof.

31. (Original) The optical media according to claim 21, wherein the optical media is a DVD and the radiation-curable composition cures by cationic polymerization.

32. (Currently Amended) A radiation-curable optical disc adhesive or lacquer composition for use on an optical disc comprising a reflective or semi-reflective layer, the composition comprising a first component comprising a photoinitiator, components that undergo free-radical polymerization when exposed to radiation and no more than 1 wt.% a cure-enhancing amount of a heterocyclic compound comprising a N atom and a double bond, the amount being sufficient to inhibit corrosion of the reflective semi-reflective layer but insufficient to reduce the cure rate or overall cure of the composition.

Claim 33. (Canceled)

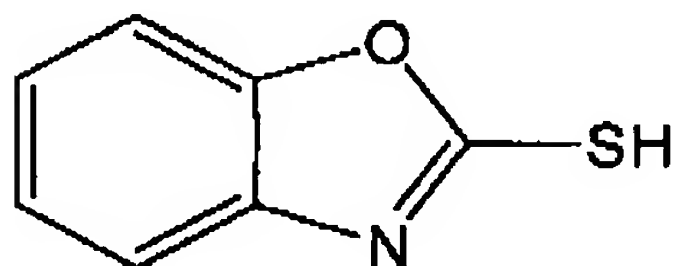
34. (Currently Amended) The radiation-curable optical disc composition according to claim ~~33~~ 32, wherein the composition is an optical disc adhesive.

35. (Original) The radiation-curable optical disc composition according to claim 34, wherein the heterocyclic compound further includes at least two N atoms and at least one double bond.

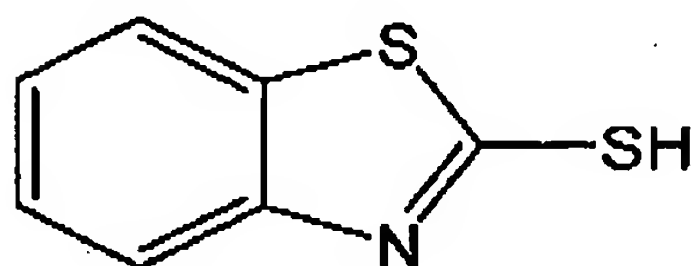
Claim 36. (Canceled)

In re Appln. of CHAWLA et al.
Application No. 10/008,489

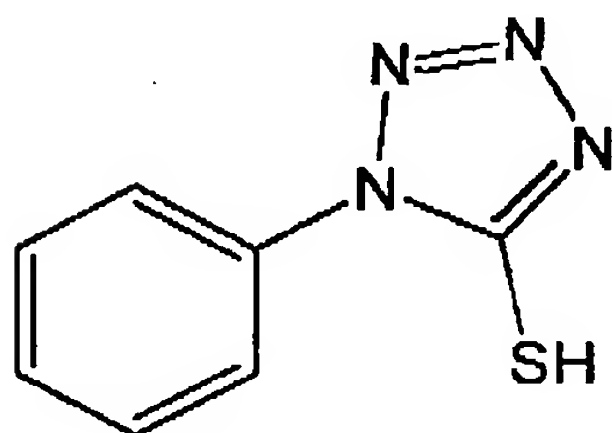
37. (Original) The radiation-curable optical disc composition according to claim 34, wherein the heterocyclic compound is selected from the group consisting of Compounds 1-12



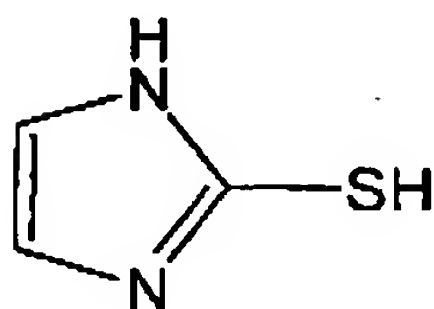
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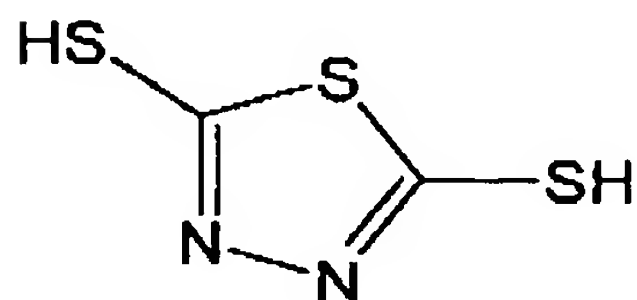
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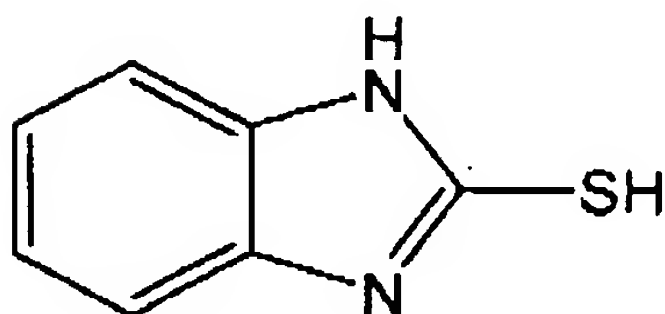
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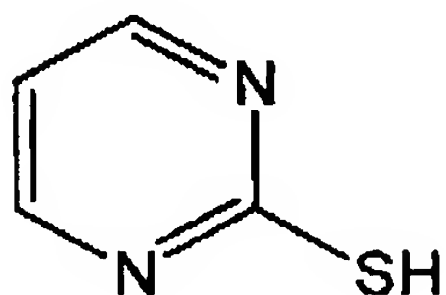


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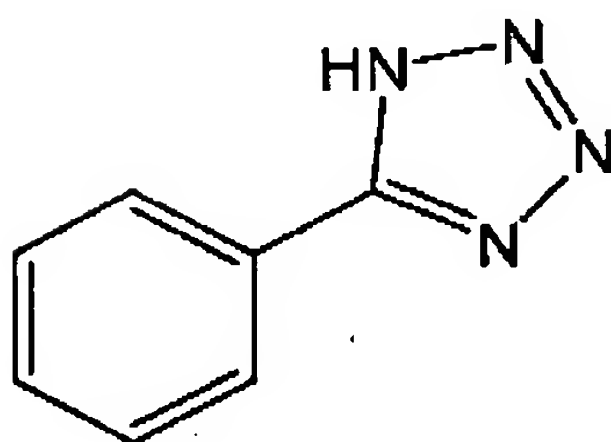


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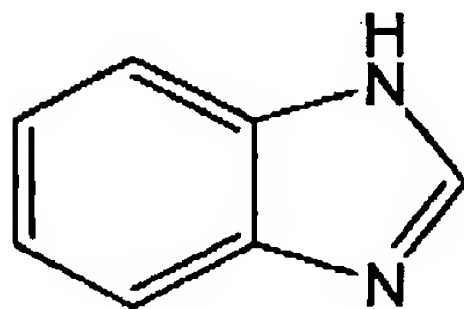
In re Appln. of CHAWLA et al.
Application No. 10/008,489



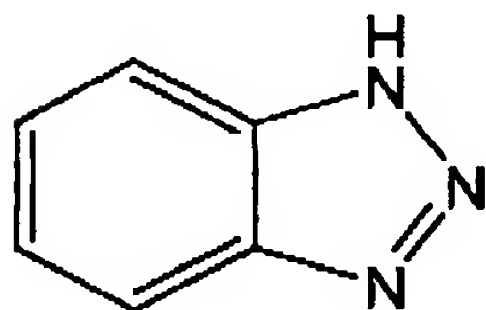
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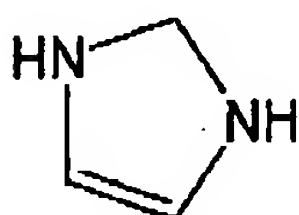
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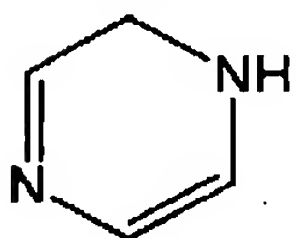
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and mixtures thereof.

38. (Previously Presented) Optical media comprising a reflective or semi-reflective layer in contact with the cured radiation-curable composition set forth in claim 32.

Claim 39. (Canceled)

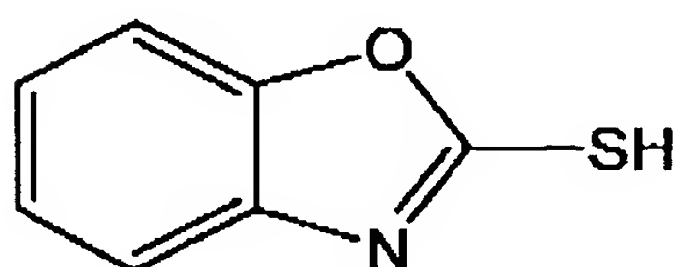
In re Appln. of CHAWLA et al.
Application No. 10/008,489

40. (Currently Amended) Optical media according to claim 39 38, wherein the cured composition is an optical disc adhesive.

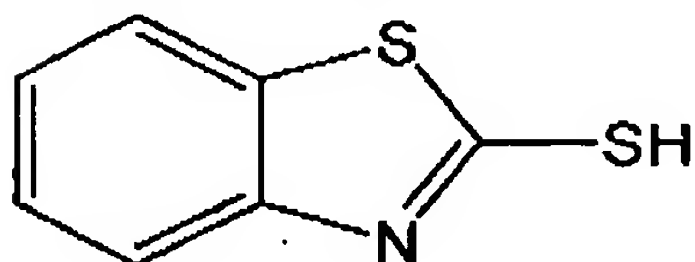
41. (Original) Optical media according to claim 40, wherein the heterocyclic compound further includes at least two N atoms and at least one double bond.

Claim 42 (Canceled)

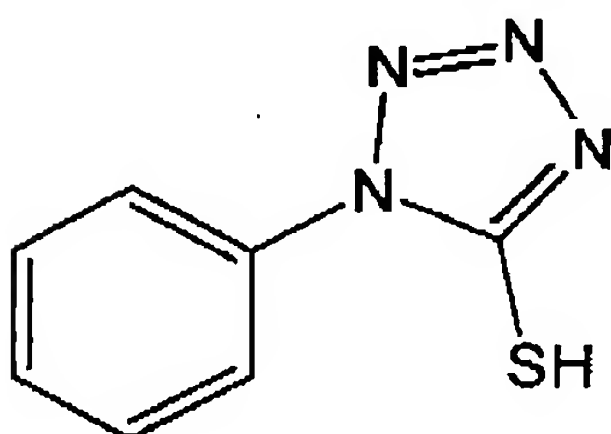
43. (Previously Presented) Optical media according to claim 40, wherein the heterocyclic compound is selected from the group consisting of Compounds 1-12



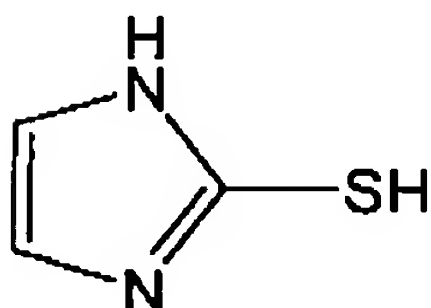
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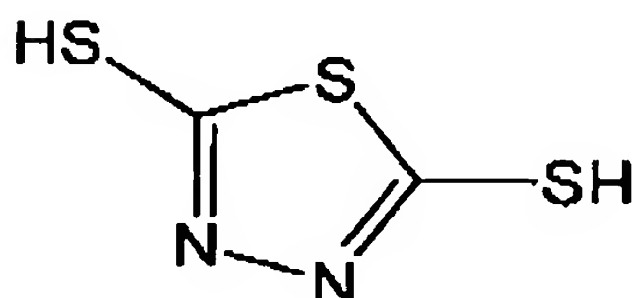
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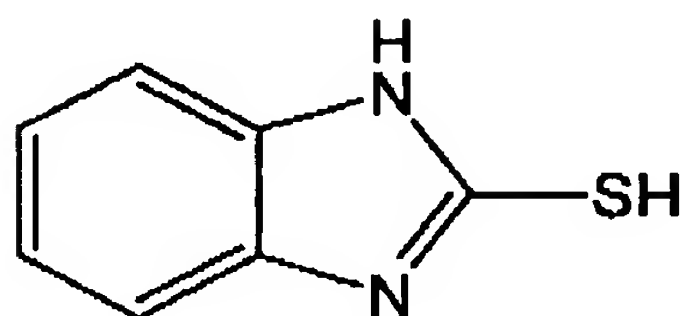


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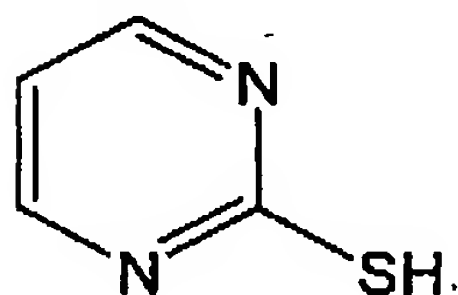


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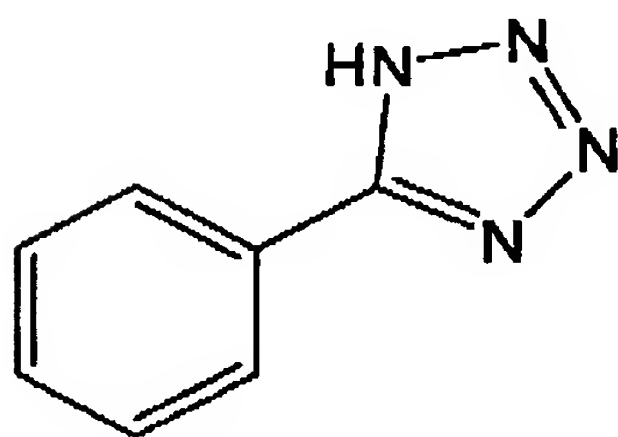
In re Appln. of CHAWLA et al.
Application No. 10/008,489



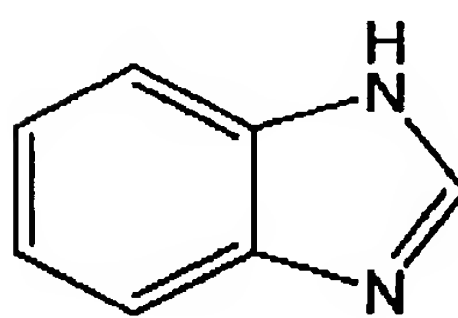
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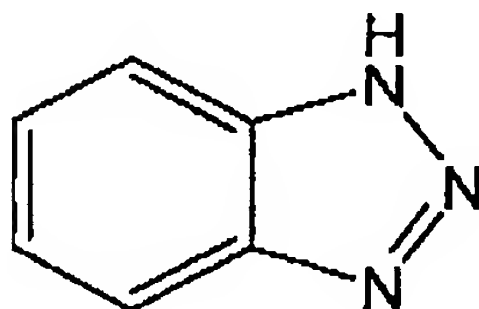
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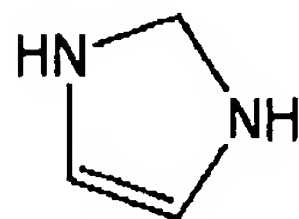
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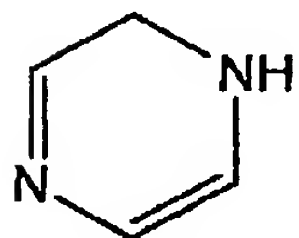
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and mixtures thereof.

In re Appln. of CHAWLA et al.
Application No. 10/008,489

44. (Original) Optical media comprising the cured radiation-curable composition set forth in claim 29.

45. (Previously Presented) The radiation-curable adhesive composition according to claim 1, wherein the radiation-curable adhesive composition further comprises dicyclopentylmethylenediacrylate.

46. (Previously Presented) Optical media according to claim 20, wherein the radiation-curable composition further comprises dicyclopentylmethylenediacrylate.

47. (Previously Presented) The optical media according to claim 46, further comprising at least two substrates, wherein the reflective or semi-reflective layer comprises silver, aluminum or alloys thereof.

48. (Previously Presented) The radiation-curable optical disc composition according to claim 32, wherein the composition further comprises dicyclopentylmethylenediacrylate.

49. (Previously Presented) Optical media comprising the cured radiation-curable composition set forth in claim 48.

Claim 50. (Canceled)

51. (Currently Amended) The radiation-curable adhesive according to claim ~~50~~ 4, wherein the amount of R-SH, R¹-R² or mixtures thereof ranges up to about 0.05 wt.%, based on the total weight of the radiation-curable composition.

52. (Previously Presented) The radiation-curable adhesive according to claim 4, wherein the amount of R-SH, R¹-R² or mixtures thereof ranges up to about 0.01 wt.%, based on the total weight of the radiation-curable composition.

Claim 53. (Canceled)

In re Appln. of CHAWLA et al.
Application No. 10/008,489

54. (Currently Amended) The optical media according to claim ~~53~~ 30, wherein the amount of the corrosion inhibiting component ranges up to about 0.05 wt.%, based on the total weight of the radiation-curable composition.

55. (Previously Presented) The optical media according to claim 54, wherein the amount of the corrosion inhibiting component ranges up to about 0.01 wt.%, based on the total weight of the radiation-curable composition.

Claim 56. (Canceled)

57. (Currently Amended) The radiation-curable optical disc composition according to claim ~~56~~ 37, wherein the amount of the heterocyclic compound ranges up to about 0.05 wt.%, based on the total weight of the radiation-curable composition.

58. (Previously Presented) The radiation-curable optical disc composition according to claim 57, wherein the amount of the heterocyclic compound ranges up to about 0.01 wt.%, based on the total weight of the radiation-curable composition.

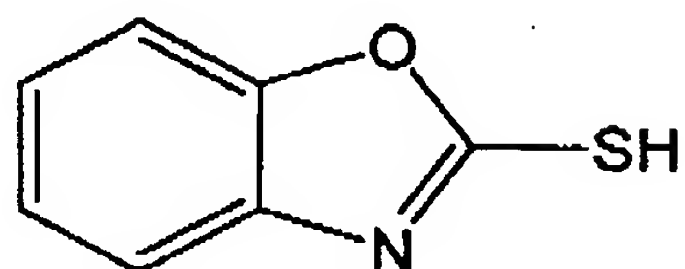
Claim 59. (Canceled)

60. (Currently Amended) The optical media according to claim ~~59~~ 43, wherein the amount of the heterocyclic compound ranges up to about 0.05 wt.%, based on the total weight of the radiation-curable composition.

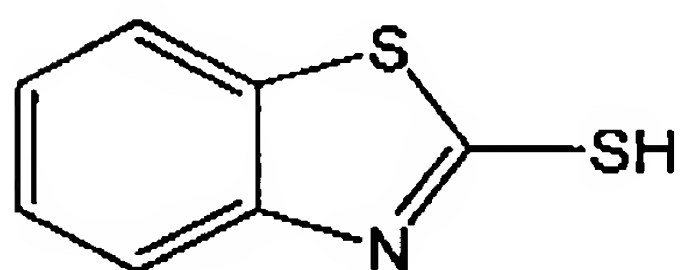
61. (Previously Presented) The optical media according to claim 60, wherein the amount of the heterocyclic compound ranges up to about 0.01 wt.%, based on the total weight of the radiation-curable composition.

62. (Previously Presented) The radiation-curable adhesive according to claim 52, wherein the R-SH, R¹-R² or mixtures thereof is selected from the group consisting of

In re Appln. of CHAWLA et al.
Application No. 10/008,489



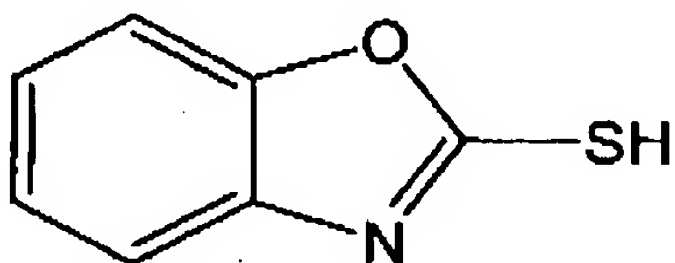
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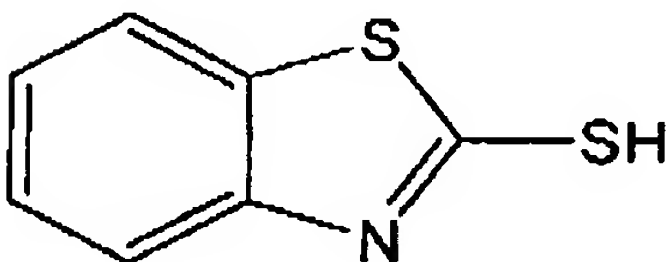
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and mixtures thereof.

63. (Previously Presented) The optical media according to claim 55, wherein the corrosion inhibiting component is selected from the group consisting of



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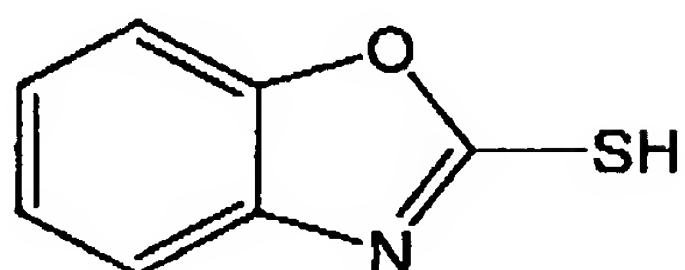


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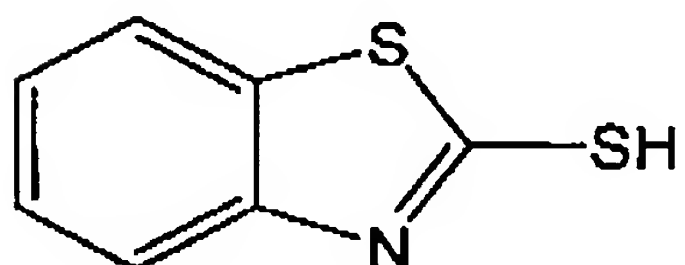
and mixtures thereof.

64. (Previously Presented) The radiation-curable optical disc composition according to claim 58, wherein the heterocyclic compound is selected from the group consisting of

In re Appln. of CHAWLA et al.
Application No. 10/008,489



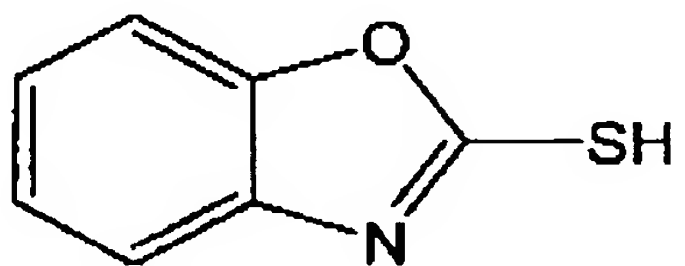
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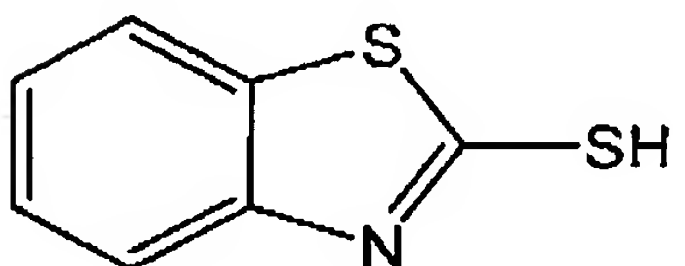
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and mixtures thereof.

65. (Previously Presented) The optical media according to claim 61, wherein the heterocyclic compound is selected from the group consisting of



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and mixtures thereof.